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EXAMINER	
CHAWAN, SHEELA C	
ART UNIT	**PAPER NUMBER**
2625	4

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/827,277	LEE ET AL.	
	Examiner	Art Unit	
	Sheela C Chawan	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6-10,12-16,18-29,32-36 and 38-40* is/are rejected.

7)☒ Claim(s) *5,11,17,30,31 and 37* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to because of draftperson's remarks (see attached PTO-948 paper number 4. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Zahavi (US. 5,592,563).

As to claim 1, Zahavi discloses a measuring device, comprising:

a camera adapted to generate images of an item being measured (fig 1, item 14, column 3, lines 35- 42); and

a processor operatively associated with the camera (fig 1, item 18, image selector is considered to be a processor, column 4, lines 65- 67) adapted to calculate the volume of the item based on the images (column 1, lines 61- 67, column 2, lines 3- 25).

As to claim 2, Zahavi discloses the measuring device wherein the processor is

adapted to identify an outline of the item and divide the outline into a plurality (column 1, lines 25- 30) of two dimensional slices (column 5, lines 43- 50), each slice having a first dimension of a constant value and a second dimension of variable value (column 5, lines 20- 50) .

Claim Rejections - 35 USC 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 3, 4,6,18-21,25-29,38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Zahavi (US. 5,592,563), as applied to the claims 1 and 2 as above and further in view of King et al.(US.5,233,518).

Regarding claim 3, Zahavi discloses a device and method for forming a high resolution image of a three dimensional object. The object is scanned so as to cover its entire volume, the scan being performed by means of linearly arranged arrays of photosensitive elements, the image is being segmented in to rectangles, which is

being evaluated so as to provide the required high resolution image. A detector matrix is moved in such a way that each row of linear detector sweeps over the entire image volume each at a different level and generates N images of the image volume in N lines (column 2, lines 3- 67, column 3, lines 1-6). Zahavi is silent about rotatable platform.

King discloses a method of reducing image helical scanning artifacts in computed tomography imaging systems divides 360 degree of projection data into two half scans. Fig 3, item 56 gantry motor controls the rotational speed and position of the object, which provides information to computer and data acquisition system (fig 3, column 5, lines 50- 68). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include a rotatable platform. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of King in order to reduce the scanning time by rotating the gantry at a faster speed and also will reduce the signal to noise ratio of the acquired data (as suggested by King at column 2, lines 20- 31).

As to claim 4, Zahavi discloses a device and method for forming a high resolution image of a three dimensional object wherein device the camera generates N images (fig 1, 18, column 1, lines 61-67, column 2, lines 3-25, column 4, lines 65-67). However, King discloses a method of reducing image helical scanning artifacts in computed tomography imaging systems divides 360 degree of projection data into two

half scans. Fig 3, item 56 gantry motor controls the rotational speed and position of the gantry, which provides information to computer and data acquisition system (fig 3, column 5, lines 50- 68).

As to claims 6 and 20, King discloses the measuring device wherein the rotatable platform is connected to a stepper motor(fig 3, item 56).

Regarding claim 18, Zahavi discloses a volumetric measuring device, comprising:

a camera (fig 1, item 14 and 15) positioned proximate adapted to generate N images of the item(column 6, lines 11-21, 65- 68);

a processor (fig 1, item 18, image selector is considered to be a processor, column 4, lines 65- 67) operatively associated with the camera and adapted to identify outlines of the item in each image, the processor being further adapted to calculate the volume of the item by calculating (column 1, lines 61- 67, column 2, lines 3- 67) a volume associated with each image and adding the volumes associated with each of the N images (column 1, lines 61- 67, column 2, lines 3- 67, column 3, lines 1- 7); and

Zahavi is silent about a platform adapted to support an item to be measured and rotate the item in N increments across a 360° range of rotation;

a display device operatively associated with the processor and adapted to display information associated with the calculated volume.

King discloses a method of reducing image helical scanning artifacts in computed tomography imaging systems. The system comprises of:

a platform (fig 3, item 56 gantry motor controls the rotational speed and position of the gantry which provides information to computer and data acquisition system) adapted to support an item to be measured and rotate the item in N increments across a 360° range of rotation (column 3, lines 52- 68, column 5, lines 52- 68);

a display device operatively associated with the processor and adapted to display information associated with the calculated volume (column 5, lines 66- 68, column 6, lines 1-20). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include a rotatable platform ... . It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of King in order to reduce the scanning time by rotating the gantry at a faster speed and also will reduce the signal to noise ratio of the acquired data (as suggested by King at column 2, lines 20- 31).

As to claim 19, Zahavi discloses the volumetric measuring device wherein the camera is a charge-coupled device (fig 1, item 14 and 15).

As to claim 21, King discloses the volumetric measuring device of claim 18, wherein the display device is a monitor adapted to display three-dimensional images representative of the item (column 5, lines 66- 68, column 6, lines 1-20).

As to claim 25, Zahavi discloses a method of calculating the volume of a sample, comprising the steps of:

digitizing the images on a pixel grid (column 4, lines 19- 29);

identifying an outline of the sample by identifying the pixels within the grid above a predetermined threshold intensity for each image (column 1, lines 61-67, column 2, lines 3-67, column 4, lines 20- 29, column 5, lines 43- 50);

dividing the image into a plurality of parallel slices (column 3, lines 44- 67);

tabulating the height and width of each slice (column 2, lines 42- 67, column 3, lines 1-7);

calculating a volume associated with each slice (column 2, lines 42- 67, column 3, lines 1-7); and

summing the calculated volumes associated with each slice for each of the N images (fig 4, column 5, lines 19-33).

Zahavi discloses a device and method for forming a high resolution image of a three dimensional object. The object is scanned so as to cover its entire volume, the scan being performed by means of linearly arranged arrays of photosensitive elements, the image is segmented into consecutive rectangles which is being evaluated so as to provide the required high resolution image. A detector matrix is moved in such a way that each row of linear detector sweeps over the entire image volume each at a different level and generates N images of the image volume in N lines (column 2, lines 3- 67, column 3, lines 1-6). Zahavi is silent about recording camera images of the sample from N angles the N angles rotating 360°.

King discloses a method of reducing image helical scanning artifacts in computed tomography imaging systems divides 360 degree of projection data into two half scans. The system comprises of:

recording camera images of the sample from N angles, the N angles totaling 360° (column 1, lines 42- 48, column 3, lines 52- 68, column 5, lines 52- 68, fig 3, item 56 gantry motor controls the rotational speed and position of the object and provides information to computer and data acquisition system, fig 3, column 5, lines 50- 68). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include a rotatable platform. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of King in order to reduce the scanning time by rotating the gantry at a faster speed and also will reduce the signal to noise ratio of the acquired data (as suggested by King at column 2, lines 20- 31).

For claim 38, see the above rejection of claim 25.

For claim 39, see the above rejection of claim 25.

As to claim 40, Zahavi discloses the method of calculating a volume of a sample wherein each pixel has an intensity and wherein at least one of the height and width are determined by comparing (column 2, lines 3- 13) each pixel intensity to a threshold level of intensity (column 2, lines 42- 67, column 3, lines 45- 67, column 4, lines 20- 29).

As to claim 26, Zahavi discloses the method wherein each slice includes a plurality of portions and wherein the method further includes the step of calculating the volume of each slice portion before calculating the volume of each slice (column 1, lines 61-67, column 2, lines 3-67, column 3, lines 1-7).

As to claim 27, King discloses the method wherein the recording step is performed by placing the item on a platform (fig 3, item 56 gantry motor controls the

rotational speed and position of the gantry which provides information to computer and data acquisition system), rotating the platform in N increments, and recording an image at each increment of rotation (column 1, lines 42- 62).

As to claim 28, Zahavi discloses method wherein the height tabulation step is performed by dividing the outline into a plurality of slices wherein each slice has a height of one pixel (column 2, lines 1-67, column 3, lines 1-7).

As to claim 29, King discloses the method wherein the width calculation step is performed by counting the number of pixels within each slice above the threshold intensity (column 6, lines 11-21, 65- 68).

4. Claims 7- 8, 16, 22 –24 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Zahavi (US. 5,592,563) in view of King et al.(US.5,233,518), as applied to the claims 1-4, 6,18-21,25-29,38-40 above and further in view of Stansbury et al. (US.6,184,339 B1).

Regarding claims 7 and 22, Zahavi discloses a device and method for forming a high resolution image of a three dimensional object. The object is scanned so as to cover its entire volume. Zahavi is silent about measuring device including an isolation chamber, and wherein the rotatable platform and item are positioned within the isolation chamber.

Stansbury discloses method acrylate resins with moderate to high organofluorine contents, which are curable to form high strength polymeric networks. The system comprises of:

device including an isolation chamber (fig 1 item 16, contains mercury which is consider to be in an isolation chamber, column 38, lines 11- 21) and wherein the rotatable platform (fig 1, item 20, quartz plate is consider to be rotatable platform which is positioned within the isolation chamber (fig 1, column 38, lines 11- 21). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include an isolation chamber, and wherein the rotatable platform is positioned within the isolation chamber. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of Stansbury in order to provide a chamber for using the inhert dental composite that has low shrinkage and significantly improved durability compared with existing materials (as suggested by Stansbury at column 3, lines 65- 67).

As to claims 8 and 23, Stansbury discloses the measuring device further including an opaque background within the isolation chamber (fig 1 item 16, contains mercury 16 in an isolation chamber, column 38, lines 11- 21).

As to claim 16, Zahavi discloses the measuring device wherein the slices are horizontal, each slice has a height of one pixel and a width calculated by the processor by counting the number of pixels in each slice above a threshold level of intensity (column 4, lines 20- 29, column 4, lines 19- 29, 36- 58).

Regarding claim 24, Zahavi discloses a device and method for forming a high resolution image of a three dimensional object. The object is scanned so as to cover its entire volume. Zahavi is silent about at least one light source, the at least one light source being adapted to illuminate the item and not the background.

Stansbury discloses a method acrylate resins with moderate to high organofluorine contents, which are curable to form high strength polymeric networks.The system comprises of:

volumetric measuring device further including at least one light source, the at least one light source being adapted to illuminate the item and not the background (fig 1, item 22, column 38, lines 15- 21). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include at least one light source, the at least one light source being adapted to illuminate the item and not the background. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of Stansbury would results in a faster polymerization with a greater exothermic reaction (as suggested by Stansbury at column 2, lines 18- 24).

5. Claims 9 –10, 12-16, 32- 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over by Zahavi (US. 5,592,563) in view of King et al.(US.5,233,518), as applied to the claims 1-4, 6, 7-8,16, 18-29, 38-40 above and further in view of Stansbury et al. (US.6,184,339 B1).

As to claim 9, Stansbury discloses the measuring device further including a display, the display adapted to communicate the calculated volume to a user (column 42, lines 21- 30).

As to claim 10, Stansbury discloses the measuring device wherein the item volume is calculated before and after an event, and wherein the volumes before

(column 17, lines 22- 32) and after the event are viewable on the display (column 38, lines 54- 67, column 39, lines 1-24).

As to claim 12, Stansbury discloses the measuring device wherein the volumes before (column 17, lines 22- 32) and after the event are displayed (column 21, lines 44- 45) as three dimensional representations (column 2, lines 9- 24) of the item (column 38, lines 54- 67, column 39, lines 1-24).

As to claim 13, Stansbury discloses the measuring device wherein the volumes before and after are displayed repeatedly in alternating fashion (column 17, lines 22- 32, column 21, lines 44- 45).

As to claim 14, Stansbury discloses the measuring device wherein the event is shrinkage of the item (column 2, lines 55- 67).

As to claims 15, and 33, Stansbury discloses the measuring device wherein the item is a dental material (column 2, lines 25- 49), and the shrinkage occurs as a result of polymerization due to exposure of the item to light (column 42, lines 52- 67).

Regarding claim 32, Zahavi discloses a device and method for forming a high resolution image of a three dimensional object. The object is scanned so as to cover its entire volume. The method comprises of:

the steps of changing the sample volume, repeating the recording, digitizing (column 4, lines 19-20), identifying (column 1, lines 61-67, column 2, lines 3-67, column 4, lines 20- 29, dividing (column 3, lines 44-67), tabulating (column 2, lines 42- 67, column 3, lines 1-7), calculating and summing steps (fig 4, column 5, lines 19-33), and determining a percent change in sample volume before and after the changing step.

Zahavi is silent about the steps of changing the sample volume, repeating the recording and, determining a percent change in sample volume before and after the changing step.

Stansbury discloses a method acrylate resins with moderate to high organofluorine contents, which are curable to form high strength polymeric networks. The system comprises of:

the steps of changing the sample volume (column 17, lines 22- 32, column 38, lines 54-67, column 39, lines 1-24), repeating the recording and (column 18, lines 9-12), determining a percent change in sample volume before and after the changing step (column 17, lines 45- 53). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi to include the steps of changing the sample volume, repeating the recording and, determining a percent change in sample volume before and after the changing step. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Zahavi by the teaching of Stansbury in order to provide a chamber for using the inhert dental composite that has low shrinkage and significantly improved durability compared with existing materials (as suggested by Stansbury at column 3, lines 65- 67).

As to claims 34- 36, Stansbury discloses the method further including the step of displaying the change in volume on an operator interface device (column 21, lines 46-47).

Allowable Subject Matter

6. Claims 5, 11,17, 30, 31, 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Other prior art cited

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

DiMatteo (US.3,932,923) discloses method of generating and constructing three-dimensional bodies.

Sayama et al.(US.5,062,127) discloses metals assay apparatus and method.

Avila et al.(US.5,934,288) discloses method and apparatus for disaplaying 3D ultrasound data using three modes of operation.

Tannenbaum et al.(US. 6,535,623 B1) discloses curvature based system for the segmentation and analysis of cariac magnetic reasonance images.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is 703-305- 4876. The examiner can normally be reached on Monday - Thursday 6 - 7.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 703-308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SCC

Sheela Chawan
Patent Examiner
Group Art Unit 2625
March 19, 2004

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